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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/646,056 | 08/22/2003 | D. Alan E. Johnson | BMA2218 | 8514 |
| 30245 7590 01/17/2007 ANTHONY EDW. J CAMPBELL PO BOX 160370 AUSTIN, TX 78716 | | | EXAMINER BARTON, JEFFREY THOMAS | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1753 | |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | MAIL DATE | DELIVERY MODE | |
| 3 MONTHS | | 01/17/2007 | PAPER | |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/646,056

Applicant(s)

JOHNSON, D. ALAN E.

Examiner

Jeffrey T. Barton

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-19 is/are allowed.
- 6) ☒ Claim(s) 1-8 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because feature 34 in Figure 2 is labeled "Servo for yam alignment", although "Servo for yaw alignment" was clearly intended. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 9 is objected to because there is no antecedent basis for "the storage and retrieval modes" in line 45 of the claim. In addition, in the current version of the claims,

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claim 12 begins on the same line as the end of claim 11, which is not proper presentation of the claims. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1, 2, 4, and 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Mori.

Regarding claim 1, Mori discloses a light collector element (Figure 8) comprising a primary collection lens (21) and secondary fine-focus (22) lenses, directing light to an optical conduit (photoconductor) as claimed (Column 5, lines 56-67), light collector alignment means comprising plural photocells (Column 6, line 6 - Column 7, line 13)

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attached to drive system (Column 7, lines 18-26) for orienting the collector directly towards the sun. Figure 8 shows no housing, but the Examiner's position is that the lenses and sensors described would inherently need a support structure to hold them in their relative positions, which would read on the claimed housing.

In the embodiment of Figure 8, Mori is silent concerning the nature of the drive system.

However, in an earlier embodiment (Figure 3), Mori described a drive system suitable for orienting the sensors of his invention toward the sun, comprising servomotors 11X and 11Y, which are driven by a processing circuit comparing signals from the sensors in order to automatically align the sensors to maximize alignment with the sun. (Column 3, lines 8-26)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the embodiment of Figure 8 of Mori by specifically using the sensor-controlled servomotors of the embodiment of Figure 3 of Mori, because Mori teaches the effectiveness of this system in orienting his sensors towards the sun to maximize collection of solar energy, and does not teach any other means of doing so.

In this rejection, undue weight is not given to the limitation "for delivering collected light to a mechanical generator" (Lines 8-9), which corresponds to the intended use of the device and does not explicitly require any particular structure.

Regarding claim 2, Mori shows lens 21 as a flat lens (Figure 8) that focuses light onto the smaller lens 22.

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Regarding claim 4, the device of Mori requires a large lens (21) at one end that focuses incoming light to a smaller lens 22, which subsequently focuses the beam of light onto/into a photoconductor that is not shown. Certainly, the area of the photoconductor on which the light impinges will be much smaller than the area of lens 21. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to build the housing in pyramidal shape as claimed, because this would require the least amount of material of any housing design (e.g. compared to a cylindrical housing), and would facilitate support of smaller lens 22. Note also that in *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966), the court held that the configuration of the claimed object was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.

Regarding claim 7, the two motors of Figure 3 control alignment in the x-direction and y-direction independently. This corresponds to "pitch" and "yaw" inasmuch as these terms denote "up/down" and "left/right" motion relative to each other.

6. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowers, Jr. in view of Mori.

Regarding claim 1, Bowers discloses a light collector element (Figure 2) comprising a primary collection lens (12) and a secondary fine focus lens (26) that focus light into a light pipe (32) as claimed, an optical housing as claimed (e.g. Figure 3 shows

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an example of support structure necessary for holding the component lenses and light pipe in the required relationship), and generic alignment means. (Column 2, lines 3-13)

Regarding claim 2, the Fresnel lens used by Bowers as the primary lens is flat, and the secondary lens has a smaller area than the primary lens. (Column 2, lines 33-35)

Regarding claim 3, Bowers discloses using optical fibers for light conduction. (Column 1, lines 62-68)

Regarding claim 4, Regarding claim 4, the device of Figure 2 of Bowers requires a large lens (12) at one end that focuses incoming light to a smaller lens 26, which subsequently focuses the beam of light into a light pipe with an area much smaller than the area of lens 12. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to build the housing in pyramidal shape as claimed, because this would require the least amount of material of any housing design (e.g. compared to a cylindrical housing), and would facilitate support of smaller lens 26. Note also that in *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966), the court held that the configuration of the claimed object was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.

Bowers does not explicitly disclose the particulars of the light collector alignment means, stating only that "suitable conventional sensing and tracking means" may be used for this purpose. (Column 2, lines 9-10)

Regarding claims 1 and 5, Mori discloses a drive system using light sensors suitable for orienting solar collectors toward the sun (Column 1, lines 5-11; Figures 1-3), comprising an opaque cylinder (1) having photocells (4X1, 4X2, 4Y1, 4Y2) disposed at the bottom thereof such that a signal corresponding to alignment (i.e. Minimum difference in signal between pairs of sensors) is maximized by direct alignment with the sun, wherein the photocells are connected to servomotors 11X and 11Y, which are driven by a processing circuit comparing signals from the sensors in order to automatically align the sensors to maximize alignment with the sun. (Column 3, lines 8-26)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Bowers by specifically using the alignment system taught by Mori, because Mori teaches its improved ability to enable smooth tracking of the sun relative to previous systems (Column 1, lines 44-63), and because Bowers leaves choice of a suitable tracking system up to the skilled artisan. (Column 2, lines 3-13)

Regarding claim 6, it would have also been obvious to one having ordinary skill in the art to provide multiple sun tracking sensors on the perimeter of the collector, because it would allow proper alignment in case of the malfunction of one or more of the sensors and maximization of the accuracy of the alignment through averaging of the signals of the multiple sensors. Note also that in *In re Harza*, 274 F.2d 669, 124 USPQ

378 (CCPA 1960), the court held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced.

Regarding claim 7, the two motors of Figure 3 of Mori control alignment in the x-direction and y-direction independently. This corresponds to "pitch" and "yaw" inasmuch as these terms denote "up/down" and "left/right" motion relative to each other.

7. Claims 8 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowers, Jr in view of Mori and Marks.

Bowers discloses a light collector element (Figure 2) comprising a primary collection lens (12) and a secondary fine focus lens (26) that focus light into a light pipe (32) as claimed, an optical housing as claimed (e.g. Figure 3 shows an example of support structure necessary for holding the component lenses and light pipe in the required relationship), and generic alignment means. (Column 2, lines 3-13)

Bowers does not explicitly disclose the particulars of the light collector alignment means, stating only that "suitable conventional sensing and tracking means" may be used for this purpose. (Column 2, lines 9-10)

Mori discloses a drive system using light sensors suitable for orienting solar collectors toward the sun (Column 1, lines 5-11; Figures 1-3), comprising an opaque cylinder (1) having photocells (4X1, 4X2, 4Y1, 4Y2) disposed at the bottom thereof such that a signal corresponding to alignment (i.e. Minimum difference in signal between pairs of sensors) is maximized by direct alignment with the sun, wherein the photocells are connected to servomotors 11X and 11Y, which are driven by a processing circuit

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comparing signals from the sensors in order to automatically align the sensors to maximize alignment with the sun. (Column 3, lines 8-26)

Mori uses comparison of sensor output (i.e. voltage) by analog differential amplifiers to determine the direction in which the servomotors must move. (Column 3, lines 12-26) Mori is silent concerning the means by which the signal is converted to motion.

Marks teaches that computer (i.e. digital) control of motion in a sensor-based sun tracking system provides accurate control. (Abstract, Column 4, lines 13-41)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Bowers by specifically using the alignment system taught by Mori, because Mori teaches its improved ability to enable smooth tracking of the sun relative to previous systems (Column 1, lines 44-63), and because Bowers leaves choice of a suitable tracking system up to the skilled artisan. (Column 2, lines 3-13)

Furthermore, it would have been obvious to use a computer to interpret the signals from the sensors to actuate motion of the servo motors, as taught by Marks, because he teaches that this provides accurate control of the motors. Such a combination of circuitry (i.e. analog with digital) reads on the claimed circuit.

Specific to claim 20, it would have also been obvious to one having ordinary skill in the art to provide multiple sun tracking sensors on the perimeter of the collector, because it would allow proper alignment in case of the malfunction of one or more of the sensors and maximization of the accuracy of the alignment through averaging of the

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signals of the multiple sensors. Note also that in *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960), the court held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced.

Allowable Subject Matter

8. Claims 9-19 are allowed.

9. The following is an examiner's statement of reasons for allowance:

The closest prior art is considered to be Best and Abernathy. Both of these references teach systems (Figure 1 of each reference) for conversion of solar heat energy to electricity, including using solar heat to mechanically generate electricity that is used to electrolytically generate hydrogen from water, which is in turn used to power a fuel cell (Best) or burned to supplement the solar heat used to operate the mechanical generator (Abernathy). Neither reference teaches a solar collector with the detailed structure claimed, a hydrogen pump as claimed, or the claimed additional photocell sensor that switches the system between storage and retrieval modes. Abernathy also lacks a fuel cell, while Best lacks the claimed gas burner below the heat chamber and connection of the hydrogen tank to this burner. In the examiner's opinion, such substantial modification of either reference would not have been obvious to one having ordinary skill in the art, since the prior art of record lacks adequate teaching to support such a conclusion.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Jeffrey T. Barton whose telephone number is (571) 272-1307. The examiner can normally be reached on M-F 9:00AM - 5:30PM.

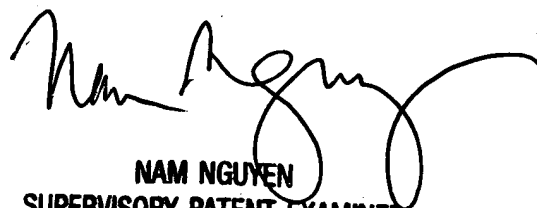
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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5 January 2007



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